

fliers and often range very widely from their breeding places. Especially is this true of the females, which may often be found far away coursing through the woods, along the roads, or over fields in search of food. The male will often patrol a selected reach of stream or area of a pond, viciously attacking any other male of his own or another species which happens to wander into his chosen territory.

Libellula pulchella and *Plathemys trimaculata* are much given to perching on sticks, cat-tails and in other exposed situations in the bright sunlight. Gomphines are most frequently seen when at rest, perched upon stones or upon the dry banks of streams or ponds. Some strong flying species, such as *Anax junius* and the *Æshnas* are seldom seen at rest in the daytime, and often continue their search for prey during the twilight hour, though a crepuscular habit is not common to the group.

Boyeria vinosa is usually found in shaded situations along streams, and the *Somatochloras* frequently wander far into the forests. The small Libellulines, *Perithemis domitia* and *Nannothemis bella* seldom are found very far from the lily-pads and the open water at the edge of pools and lakes. On the other hand the species of *Sympetrum*, a related genus, range far afield.

The small, thin-bodied demoiselles usually do not wander far and generally fly low among the grasses and weeds, or hover close over or rest upon the lily-pads and floating vegetation of the marshes. The species of *Agrion* (*Calopteryx*) are fond of shady places along the creeks and springs.

Notes on the habits and occurrence of our local species are given by Mr. Wm. T. Davis in the paper which follows this.

DRAGONFLIES OF THE VICINITY OF NEW YORK CITY WITH A DESCRIPTION OF A NEW SPECIES.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND.

In this JOURNAL for March, 1895, Dr. Philip P. Calvert published a list of "The Odonata of New York State," and in the June, 1897, number, appeared his "Additions to the Odonata of New York State."

Also in this JOURNAL for September, 1898, appeared a "Preliminary List of the Dragonflies of Staten Island, with notes and Dates of Capture," by the present author. The information contained in these publications, together with the last edition of the New Jersey list, and much unrecorded material gathered in recent years has formed the basis of the present list, which numbers one hundred and seventeen species. The author has personally taken all but seven of the species at localities here recorded. He has been presented with four of the others by their captors; has examined two in collections, leaving but one species to be added from the literature alone. Only four records have been taken from Dr. Calvert's New York lists, as most of his material came from localities further up the state. Following these and other copied records, the collector's name is given in parenthesis.

The New Jersey list enumerates one hundred and nine species and the present list will add nine, including a new species, to the number known to occur in that state, all but three belonging to the Agrionidæ. Several species are also added to the New York list. *Ischnura kellicotti* has, according to the New Jersey list, been found in Ocean and Atlantic counties, but it will certainly be collected nearer to New York City than at present recorded.

To Prof. Raymond C. Osburn I am indebted for the suggestion that I prepare the present list to include the species taken at localities within about fifty miles of New York City, and also for much help in connection with the new species. Mr. Lewis B. Woodruff has kindly given me a list of his captures, many of which were made in Westchester Co., N. Y.; Mr. George P. Engelhardt, of the Children's Museum of the Brooklyn Institute of Arts and Sciences, has let me go over his material, and Mr. Frank E. Watson has added to my collection from time to time such species as attracted his attention while in quest of butterflies. This information, together with one or two other records from friends, is in each case followed by the name of the contributor. When no name is given the records have been taken from material in the author's collection.

In the matter of classification the recent "Catalogue of the Odonata of North America," by Richard A. Muttkowski, has been followed.

Family AGRIONIDÆ.**Genus AGRION Fabricius.****A. maculatum Beauvois.**

Common along brooks in June, July and August, and generally distributed. This dragonfly will fly from a twig or low plant by the brook side, catch a tiny insect and return to the same station again. They often come back to the same resting place many times in succession where they remain until some small insect attracts their attention and they sally forth to catch it. In this respect they resemble the insect-catching phœbe bird and its relatives. Though usually a slow flyer this species often indulges, when two males happen to meet, in a very rapid aerial dance and at such times their bright colors show to the best advantage. They will advance against each other, dodge or recede, with remarkable rapidity and grace, but neither of the combatants ever appears to be injured. It seems to be more of an endurance test.

A. æquabile Say.

Bronx Park, N. Y. City, VI, 3; Newfoundland, N. J., V, 6, and Great Notch, N. J., V, 30 (Davis); Long Island, VIII, 12 (Engelhardt). This is an addition to the New Jersey list.

A. dimidiatum apicale Burmeister.

Jamesburg, N. J., VII; Lakehurst, N. J., VI, VII. At the last mentioned locality it is often quite common flying up and down the larger ditches in the cranberry bogs.

Genus HETÆRINA Hagen.**H. americana Fabricius.**

Collected at Paterson, N. J., in September by John A. Grossbeck. It has also been taken in Morris Co., N. J., by Dr. Calvert (N. J. list). When found at all, it is usually present in considerable numbers and flies up and down ditches and along the banks of slow flowing rivers.

Genus LESTES Leach.**L. eurinus Say.**

It has been taken on two occasions, June 18 and July 4 about a small tree shaded pond on Staten Island. Riverdale, N. Y., VII (Woodruff).

L. congener Hagen.

Bronxville, N. Y., VII, VIII (Woodruff); Flushing, N. Y., VIII; Staten Island, IX, X, XI; Lakehurst, N. J., X. This and the other species of *Lestes* are to be found about ponds and ditches.

L. unguiculatus Hagen.

Newfoundland, N. J., VII; Bronxville N. Y., VI, VII (Woodruff); Yaphank, N. Y., IX; Wading River, N. Y., Long Pond, VIII; Staten Island, VI, VII. Females have been observed ovipositing in the stems of grasses growing on the edge of a small pond on Staten Island, July 15.

L. uncatus Kirby.

Newfoundland, N. J., VII, 4 (Davis); Bronxville, N. Y., VII (Woodruff). This is an addition to the New Jersey list.

L. vigilax Hagen.

Yaphank, N. Y., VII; Wading River, N. Y., VIII; Wyandanch, N. Y., VII; Lakehurst, N. J., VI, VIII, IX.

L. rectangularis Say.

Commonly distributed in the vicinity of N. Y. City from VI-IX.

L. forcipatus Rambur.

Bronxville, N. Y., VI, VII, VIII; Yaphank, IX; Wading River, N. Y., Deep Pond, VIII; Staten Island, IV-VIII.

L. disjunctus Selys.

Wading River, N. Y., Long Pond, VIII. It has also been taken at Calverton, Long Island, N. Y., in Sept. which, however, is somewhat beyond our limits.

L. inæqualis Walsh.

Morris Co., N. J. (C. W. Johnson, N. J. list); Staten Island, VI, VII.

Genus ARGIA Rambur.**A. moesta putrida Hagen.**

Chatham, N. J., VIII (Dr. Calvert, N. J. list); Greenwood Lake, N. J., VI, 30 (Watson); Little Falls, N. J., VII.

A. translata Hagen.

Hank's Pond near Newfoundland, N. J., IX. Hopatcong, N. J., VII (S. N. Rhoads, N. J. list).

A. tibialis Rambur.

Singac, N. J., VI, 15. In the low meadows bordering the Passaic River.

A. apicalis Say.

Staten Island.

A. bipunctulata Hagen.

Newfoundland, N. J., VI, 4; Lakehurst, N. J., VI, VII.

A. violacea Hagen.

Bronxville, N. Y., VII (Woodruff); Newfoundland, N. J., VII; Staten Island, VII, VIII; Yaphank, N. Y., VII, IX; Smithtown, N. Y., VIII; Wyandanch, N. Y., VII, Flushing, N. Y., VIII; Lakehurst, N. J., V, 30, VII. To be found about most ponds and the commonest species of the genus.

Genus ENALLAGMA Charpentier.**E. durum Hagen.**

In the New Jersey list it is reported from Toms River and other localities in the southern part of the state.

E. cyathigerum Charpentier (annexum Hagen).

West Point, N. Y., VI, 4; Ramsey, N. J., V, 20. This is an addition to the New Jersey list.

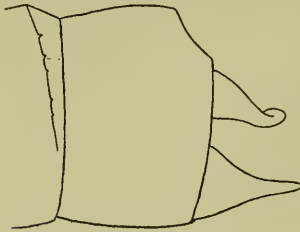
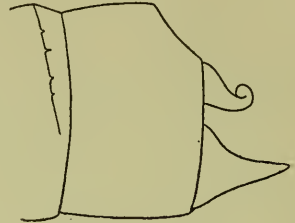
E. geminatum Kellicott.

Lake Hopatcong, N. J., IX (Dr. Calvert, N. J. list); Jamesburg, N. J., VII (P. Laurent, N. J. list); Staten Island, VIII, 8, 1909, many in Clove Valley; Yaphank, N. Y., VII, IX; Wyandanch, N. Y., VII; Flushing, N. Y., VIII.

Enallagma recurvatum new species.

Male.—Head black, beneath pale, the following blue; band on front between eyes and postocular spots. Prothorax black above, pale beneath; thorax pinkish or yellowish, a middorsal, a humeral stripe and a spot on the first and second sutures just under the wing bases, black; in alcohol metallic greenish black. Abdominal segments pale beneath, blue above and black as follows: a basal spot on dorsum and a minute apical spot each side on 1, a short apical spot connected with a narrow apical ring on 2, apical third of 3, apical half of 4, apical two thirds of 5, apical three quarters of 6, all of 7 except basal ring, a narrow black linear spot each side on 8, dorsum of 10. Legs pale; femora above and tibia anteriorly, black; tarsi pale, black at sutures and tips of claws. Superior abdominal appendages black, tipped with pale, inferiors pale, tipped

with black. In shape like those of *hageni* Walsh, but with the superiors shorter and the extremities more upturned, as shown in the accompanying figures.

*E. HAGENI**E. RECURVATUM*

Female.—Head and prothorax colored as in the male, abdomen pale beneath with dorsum black with indications of basal rings, the black on the eighth segment becoming more or less of an apical spot. No constant differences have been discovered between the females of this species and *hageni*. Abdomen, male, 22 mm.; female, 21 mm. Hind wing, male, 15 mm.; female, 16 mm.

The type male is from Wyandanch, Long Island, N. Y., July 1, 1910, and the female from Lakehurst, N. J., June, 1898, when a pair were taken in copulation. Nine male paratypes and one female are from Wyandanch, and three males from Lakehurst collected in May and June.

The species is most nearly related to *Enallagma hageni*, being colored about as in that insect, but may be readily told from it by the shorter superior appendages of the male. Some of the male paratypes are without the linear spot on each side of segment eight. The species has been named *recurvatum* on account of the character of the male superior appendages. Mr. E. B. Williamson, Dr. Philip P. Calvert and Prof. Albert P. Morse have each examined a single male of this *Enallagma* from Wyandanch, and Prof. Raymond C. Osburn has seen the entire series. To them, and to Mr. John A. Grossbeck, who made the outline sketches of the male abdominal appendages, I am under obligations.

***E. piscinarium* Williamson.**

Lakehurst, N. J., V, 29, 1910 (Woodruff). This is an addition to the New Jersey list.

***E. divagans* Selys.**

Long Island (N. Banks, N. Y. list); Lakehurst, N. J., V, 30.

E. exsulans Hagen.

Pine Island, N. Y., VI; Bronxville, N. Y., VII (Woodruff); West Farms, N. Y. City (J. Angus).

E. ebrium Hagen.

Newfoundland, N. J., VII; Lake Hopatcong, N. J., VII. This is an addition to the New Jersey list.

E. carunculatum Morse.

Stony Point, N. Y., VI; Bronxville, N. Y., VI, VIII (Woodruff); Yaphank, N. Y., VII, IX; Newfoundland, N. J., VII.

E. doubledayi Selys.

Wading River, N. Y., Deep Pond, VIII.

E. civile Hagen.

A common species about ponds, etc., from June to September, and generally distributed. Some of the localities are Yaphank, Fire Island, Flushing, Bronxville and Staten Island, New York, and Newfoundland, Seabright and Lakehurst in New Jersey.

E. aspersum Hagen.

Dobb's Ferry, N. Y., VII (G. D. W. Williamson, N. Y. list); Yaphank, N. Y., VII, Staten Island, VI, VII, VIII. In the Canadian Entomologist, Vol. XXVI, p. 77, Mr. Banks records *E. triviatum* from Long Island, which he informs me by letter was a wrong identification.

E. pictum Morse.

Wyandanch, N. Y., VII; Lakehurst, N. J., IX. Found about ponds and ditches.

E. signatum Hagen.

Yaphank, N. Y., IX; Flushing, N. Y., VIII; Cold Spring Harbor, N. Y., VII (H. G. Barber); Staten Island, VI, VIII.

E. pollutum Hagen.

Yaphank, N. Y., IX; Lake Hopatcong, N. J., IX (Dr. Calvert, N. J. list).

Genus NEHALENNIA Selys.**N. irene Hagen.**

Nyack, N. Y., VI, Bronxville, N. Y., VII (Woodruff); Wyandanch, N. Y., VII; Yaphank, N. Y., VII; Forest Park, Brooklyn, N. Y., VI; Staten Island, VI; Ft. Lee, N. J., VI (Daecke, N. J. list); Lakewood, N. J., VI.

N. gracilis Morse.

Yaphank, N. Y., VII; Lakehurst, N. J., VI.

Genus AMPHIAGRION Selys.**A. saucium** Burmeister.

Yaphank, N. Y., VI; Half Way Hollow Hills, Long Island, N. Y., VII; Staten Island, V, VI, VIII; Hewitt, N. J., VI; Newfoundland, N. J., VII. Often found in moist meadows.

Genus CHROMAGRION Needham.**C. conditum** Hagen.

Hewitt, N. J., VI; Lakehurst, N. J., V.

Genus ISCHNURA Charpentier.**I. verticalis** Say.

From May to September and generally distributed, being found even in the city parks.

I. ramburii Selys.

Fire Island, N. Y., IX; Staten Island, IX, X.

I. posita Hagen.

From May to September and generally distributed.

Genus ANOMALAGRION Selys.**A. hastatum** Say.

Bronxville, N. Y., VII (Woodruff); Staten Island, VII, VIII, IX, X, and XI, 2, 1902. Sandy Hook, N. J., VIII. Found on salt meadows as well as about freshwater ponds, etc.

Family ÆSCHNIDÆ.**Genus TACHOPTERYX** Selys.**T. thoreyi** Hagen.

West Point, N. Y., VI, 18; Ramapo, N. Y., VI, 7 (Watson). This dragonfly is often found resting on the trunks of trees where, owing to its gray color, it can hardly be detected.

Genus CORDULEGASTER Leach.**C. diastatops** Selys.

Hewitt, N. J., V, VI; Lake Hopatcong, N. J., VI; Lakehurst, N. J., V. Sometimes not uncommon in low-lying moist meadows.

C. maculatus Selys.

Yaphank, N. Y., V (Engelhardt); Nyack, N. Y., VI; Ramapo, N. Y., V, 31; Bronxville, N. Y., VI (Woodruff); Staten Island, V, VI; Greenwood Lake, N. J., VII; Newfoundland, N. J., VII; Lakehurst, N. J., V, 22 (Engelhardt). Often found flying up and down brooks.

C. erroneus Hagen.

Bear Swamp, Ramapo Mountains, N. J., VII, 18, 1910, ♂ (Chas. E. Sleight). This is an addition to the New Jersey list.

C. obliquus Say.

Pine Island, N. Y., VI; Palisades, N. J., VI (Engelhardt); Van Cortlandt Park, N. Y. City, VI (Watson); Lake Hopatcong, N. J., VI (Watson). On June 19, 1898, two were captured in Bronx Park, N. Y. City, near to where the bear dens have since been located.

Genus GOMPHOIDES Selys.**G. obscura Rambur.**

Found on several occasions in May and June flying up and down a shaded ditch by the side of the railroad track at Lakehurst, N. J. Wading River, N. Y., Deep Pond, Aug. 7, 1912.

Genus HAGENIUS Selys.**H. brevistylus Selys.**

Long Island (Engelhardt); Newfoundland, N. J., V, VII. On the 4th of July, 1897, two of these dragonflies were observed on Jefferson Mt., near Newfoundland, N. J., engaged in chasing butterflies. One of them was particularly active, and every *Papilio* or *Limenitis* that came near was pursued, but it was not successful in catching any of them.

Genus OPHIOGOMPHUS Selys.**G. johannus Needham.**

Hewitt, N. J., VI, 19, 1904.

O. rupinsulensis Walsh.

Dover, N. J., (C. W. Johnson, N. J. list). Ramapo Mts., near Halifax, N. J., several found near a stream.

Genus **LANTHUS** Needham.**L. albistylus** Hagen.

Bear Swamp, Ramapo Mountains, N. J., VI, VII (Chas. E. Sleight). This is an addition to the New Jersey list.

L. parvulus Selys.

Ramapo, N. Y., V; Hewitt, N. J., V (Watson); Schooley's Mt., N. J., V; along South Branch of Raritan River, N. J., V.

Genus **GOMPHUS** Leach.**G. lividus** Selys (**sordidus** Hagen).

Pine Island, N. Y., VI; Bronxville, N. Y., VI (Woodruff); Newfoundland, N. J., VII; South Branch of Raritan River, N. J., VI.

G. exilis Selys.

Generally distributed about New York City and found in May and June.

G. ventricosus Walsh.

Pine Island, N. Y., VI, 19, 1912. This appears to be an addition to the list of New York State dragonflies.

G. plagiatus Selys.

Long Island (C. Olsen); Runyon, N. J., IX, 4 (Watson).

G. spicatus Hagen.

Newfoundland, N. J., V, VI.

G. villosipes Selys.

Ramsey, N. J., VI; Staten Island, VI.

G. fucifer Hagen.

Hewitt, N. J., VI, 19.

Genus **DROMOGOMPHUS** Selys.**D. spinosus** Selys.

Pine Island, N. Y., VI; Van Cortlandt Park, N. Y. City, VII (Watson); Sparta, N. J., VII; Newfoundland, N. J., VII; Lake Hopatcong, N. J., VII.

Genus **BOYERIA** MacLachlan.**B. vinosa** Say.

Yaphank, N. Y., VII, IX; Smithtown, N. Y., VIII; Staten Island, VII, VIII; Sparta, N. J., VII; Newfoundland, N. J., VII, IX; Lake-

hurst, N. J., VII. This insect is quite crepuscular in habit, and sometimes flies when it is so dark that it can be distinguished with difficulty. Sometimes each *vinosa* appears to have a certain "beat" on the ditch or brook up and down which it flies, while a little further on will be another *vinosa*, also confined to a limited range.

Genus *BASIÆSCHNA* Selys.

B. janata Say.

Pine Island, N. Y., VI; Bronxville, N. Y., VI (Woodruff); Yaphank, N. Y., V, VI; Staten Island, V; Newfoundland, N. J., V; Paterson, N. J., V; Ramsey, N. J., V; Lakehurst, N. J., V.

Genus *GOMPHÆSCHNA* Selys.

G. furcillata Say.

Yaphank, N. Y., V, VI; Ramapo, N. Y., VI; Hewitt, N. J., VI; Newfoundland, N. J., V, VI; Beaver Lake, N. J., VI; Lakehurst, N. J., V, VI.

G. furcillata antilope Hagen.

Newfoundland, N. J., VI.

Genus *ANAX* Leach.

A. junius Drury.

Generally distributed and common. Flies from March to October. On one occasion eight of these insects were observed flying about on the lea side of a barn looking for the flies that had taken refuge there from the strong wind that was then blowing.

A. longipes Hagen.

Yaphank, N. Y., VII; Staten Island, VI, VIII; Orange, N. J.; Lakehurst, N. J., VII.

Genus *ÆSHNA* Fabricius.

A. clepsydra Say.

Wading River (Deep Pond), N. Y., VIII; Greenwood Lake, VII; Terrace Pond, Passaic Co., N. J., VIII; Newfoundland, N. J., IX; Lakehurst, N. J., IX.

A. canadensis Walker.

Newfoundland, N. J., VII; Staten Island, VI.

A. verticalis Hagen.

Normanock, N. J., VII; Point Pleasant, N. J., IX; Lakehurst, N. J., IX; Brooklyn, N. Y., VII, IX (Engelhardt); Cold Spring Harbor, N. Y., VIII (H. G. Barber); Staten Island, VI, IX. On October 21, about 4 o'clock in the afternoon, a female was seen to crawl down a stick, lying in a slow flowing spring, until it was entirely beneath the surface of the water.

A. umbrosa Walker.

Bronxville, N. Y., IX, X (Woodruff); Yaphank, N. Y., X; Pine-lawn, N. Y., IX; Staten Island, VIII, IX, X; Newfoundland, N. J., IX; Bear Swamp, Ramapo Mts., N. J., IX; Ft. Lee, N. J., VIII; Cranford, N. J., VIII; Morgan, N. J., X; Mattawan, N. J., IX. Found flying up and down brooks.

A. constricta Say.

Bronxville, N. Y., VII (Woodruff); Flatbush, N. Y., IX. While the species of *Æshna* are most often found about their breeding places they are great flyers, and may be seen most anywhere in the vicinity of New York City as well as in the city itself.

Genus EPIÆSCHNA Hagen.**E. heros Fabricius.**

Generally distributed and found from May to September. It often enters buildings and may be seen flying up and down the streets in the heart of the city. A female was observed on Staten Island, on the 28th of July, laying eggs in dead, water-soaked branches lying in swampy pools in the woods.

Family LIBELLULIDÆ.**Genus DIDYMOPS Rambur.****D. transversa Say.**

Ramapo, N. Y., VI; Hewitt, N. J., VI; Bear Lake, N. J., VI (Engelhardt); Newfoundland, N. J., V, VI, VII; Mt. Arlington, N. J., VII (Watson); Great Notch, N. J., V.

Genus MACROMIA Rambur.**M. illinoiensis Walsh.**

Ft. Montgomery, N. Y., V; Ramapo, N. Y., VI; Newfoundland, N. J., VII; Lakewood, N. J., VII.

Genus EPICORDULIA Selys.

E. princeps Hagen.

Greenwood Lake, VI, VII (Watson); Newfoundland, N. J., VI, VII; Hopatcong, N. J., IX, 14 (Dr. Calvert, N. J. list); Singac, N. J., VI; New Brunswick, N. J., VII (Coll. N. J. Agri. Exp. Sta.); N. Y. City, VI (Woodruff).

Genus NEUROCORDULIA Selys.

N. obsoleta Say.

Lake Hopatcong, N. J., VI, VII, IX (N. J. list).

Genus HELOCORDULIA Needham.

H. uhleri Selys.

Newfoundland, N. J., V, 28; Lakehurst, N. J., V, 24.

Genus TETRAGONEURIA Hagen.

T. spinosa Hagen.

Great Notch, N. J., V, 5 (Dr. Love, N. J. list); Old Bridge, N. J., IV, 23.

T. spinigera Selys.

Greenwood Lake, N. J., VI, 30 (Watson); Newfoundland, N. J., V, 28 (Davis). This is an addition to the New Jersey list.

T. semiaquea Burmeister.

Yaphank, N. Y., V, 29; Ramapo, N. Y., V, VI; Ramsey, N. J., VI; Newfoundland, N. J., V; Lakehurst, N. J., V, VI.

T. cynosura Say.

Pocantico Hills, N. Y., VI (Woodruff); West Point, N. Y., VI; Ramapo, N. Y., V; N. Y. City, Wall St., VI (Woodruff); Staten Island, V, VI, VII; Hewitt, N. J., VI. On May 28, 1910, there was a remarkable gathering of this species, together with an occasional *spinigera* and *semiaquea*, along the road leading from Newfoundland, N. J., to Cedar Pond. The air was full of these dragonflies, and on one small dead bush we counted twenty-two individuals, and there were other bushes and stems of plants that also had a great many resting upon them.

Genus DOROCORDULIA Needham.

D. lepida Hagen.

Jamesburg, N. J., VII (Daecke, N. J. list); Lakehurst, N. J., V, VI.

D. libera Selys.

Bronxville, N. Y., V; N. Y. City, V (Woodruff); Normanock, N. J., VII; Beaver Lake, N. J., VI (Engelhardt); Newfoundland, N. J., V, 28 (C. Schaeffer); Paterson, N. J., V, 24 (Coll. N. J. Agri. Exp. Sta.).

Genus SOMATOCHLORA Selys.**S. filosa Hagen.**

Lakehurst, N. J., VII.

S. tenebrosa Say.

Ramapo Mts., N. J., VIII (Watson); Jamesburg, N. J., VII; Lakehurst, N. J., IX; Hauppaug, N. Y., VIII.

Genus LADONA Needham.**L. exusta Say.**

Croton, N. Y., VII; Ramapo, N. Y., VI; Ramsey, N. J., V; Newfoundland, N. J., V, VI, VII; Lake Hopatcong, N. J., VII.

L. exusta deplanata Rambur.

Amityville, N. Y., VI (W. T. Bather); Wyandanch, N. Y., IV; Newfoundland, N. J., V; Lakewood, N. J., VI; Lakehurst, IV, V, VI.

Genus LIBELLULA Linné.**L. luctuosa Burmeister (basalis Say).**

Bronxville, N. Y., VII (Woodruff); Van Cortlandt Park, N. Y. City, VII; Flushing, N. Y., VIII; Staten Island, VI, VII, VIII; Sparta, N. J., VII; New Brunswick, N. J., VI (Coll. N. J. Agri. Exp. Sta.).

L. auripennis Burmeister.

Wading River, N. Y., Long Pond, VIII; Coney Island, N. Y.; Staten Island, V, VI, VII. We have captured a male of this species on Staten Island, July 4, 1900, flying over a small pond grasping a female *L. semifasciata*.

L. flavida Rambur.

Westchester Co., N. Y. (W. Beutenmuller, N. Y. list); Ramsey, N. J., VII; Lakehurst, N. J., VI, VII, VIII. It is quite common at the last mentioned locality.

L. cyanea Fabricius.

Bronxville, N. Y., VI, VII; Riverdale, N. Y., VII (Woodruff); Yaphank, N. Y., VII; Half Way Hollow Hills, N. Y., VII; Flushing, N. Y., VIII; Staten Island, VI-VIII; Newfoundland, N. J., VII; Fort Lee, N. J., V, VI (Woodruff); Jamesburg, N. J., VI, VII.

L. vibrans Fabricius.

Staten Island, VI, VII, VIII; Lakehurst, N. J., VI (Woodruff). This species was common on Staten Island in the summers of 1894, 1899 and 1908. It was also collected in 1895 and 1912.

L. axillena Westwood.

Staten Island, Buck's Hollow, V, 31, 1908, two males.

L. incesta Hagen.

Croton, N. Y., VI; Yaphank, N. Y., VII; Wading River, N. Y., Long Pond, VIII; Ramapo, N. Y., VI; Normanock, N. J., VII; Lake Hopatcong, N. J., VII; Staten Island, VII, VIII.

L. quadrimaculata Linne.

Bronxville, N. Y., VI, VII (Woodruff); Staten Island, V, 11, 1889, and VI, 19, 1893; Lake Hopatcong, N. J. (S. N. Rhoads, N. J. list).

L. semifasciata Burmeister.

Bronxville, N. Y., V, VI, VII (Woodruff); Yaphank, N. Y., VII; Aqueduct, Long Island, N. Y., VII; Staten Island, IV, V, VI, VII, VIII, IX; Fort Lee, N. J., V, VI (Woodruff); Lakehurst, N. J., VII.

L. pulchella Drury.

A generally distributed species and found principally about ponds from May to September.

Genus PLATHEMIS Hagen.**P. lydia Drury (trimaculata DeGeer).**

Bronxville, N. Y., VI; Van Cortlandt, N. Y., VI (Woodruff); Yaphank, N. Y., VII; Flushing, N. Y., VIII; Staten Island, V, VI, VII, VIII, IX; Ft. Lee, N. J., V, VI; Lakehurst, N. J., VI (Woodruff).

Genus PERITHEMIS Hagen.***P. domitia tenera* Say.**

Tarrytown, N. Y., VII; Van Cortlandt, N. Y., VII; Bronxville, N. Y., VII, VIII (Woodruff); Wading River, N. Y., Long Pond, VIII; Flushing, N. Y., VIII; Prospect Park Lake, Brooklyn, N. Y., VIII; Staten Island, VI, VII; Westfield, N. J., VII.

Genus NANNOTHEMIS Brauer.***N. bella* Uhler.**

Westchester Co., N. Y. (W. Beutenmuller, N. Y. list); Yaphank, N. Y., VII; Wyandanch, N. Y., VII; Staten Island, VI, VII; Beaver Lake, N. J., VI (Engelhardt); Lakehurst, N. J., V, VI, VII.

Genus ERYTHRODIPLAX Brauer.***E. berenice* Drury.**

Riverdale, N. Y., VII (Woodruff); Rockaway Beach, N. Y., VII, VIII; Flushing, N. Y., VIII; Cold Spring Harbor, N. Y., VII (H. G. Barber); Staten Island, V, VI, VII, VIII; S. Amboy, N. J., VII; Seabright, N. J., VII (Woodruff). One was taken at Lakehurst, N. J., July 28, 1907, but this dragonfly is usually not found so far inland, and is often quite common on the salt meadows, where of a quiet evening they may be seen settled on the grass stems, in which position they spend the night. In many places where the meadows have been ditched to prevent the mosquitoes from developing, this dragonfly, which devours mosquitoes, has also become far less numerous.

Genus ERYTHEMIS Hagen.***E. simplicicollis* Say.**

Wading River, N. Y., VIII; Yaphank, N. Y., VII; Flushing, N. Y., VIII; Staten Island, V, VII, VIII; Fort Lee, N. J., V (Woodruff); Westfield, N. J., VII; Lakehurst, N. J., VI, VII.

Genus SYMPETRUM Newman.***S. rubicundulum* Say.**

Generally distributed and found from June until September.

***S. obtrusum* Hagen.**

Staten Island, VI, VII; Sandy Hook, N. J., VIII.

S. semicinctum Say.

Croton, N. Y., VII; Riverdale, N. Y., VII; Bronxville, N. Y., VIII (Woodruff); Van Cortlandt Park, N. Y. City, VIII; Staten Island, VII, VIII, IX, 15; Sparta, N. J., VII.

S. vicinum Hagen.

West Point, N. Y., X; Yaphank, N. Y., X; Bowling Green, N. Y. City, X; Staten Island, IX, X, XI; Lake Hopatcong, N. J., VII (S. N. Rhoads, N. J. list); Jamesburg, N. J., IX; Lakehurst, N. J., VIII, X. This is one of the latest of our dragonflies and is to be found far into the fall. We have seen them in copulation on Staten Island on November 8. They are much attracted to anything light colored, like a newspaper lying on the ground, and several may often be seen sunning themselves in such a situation. They will light on your hat, if you keep quiet, and will show no inclination to fly away provided you walk about quietly.

S. corruptum Hagen.

Staten Island, shore at Eltingville, VI, 27, 1896, and New Dorp, VIII, 8, 1903; Barnegat, N. J., VIII, 25, 1900. This species is much more common in the west and only occasionally found within our limits.

Genus PACHYDIPLAX Brauer.**P. longipennis Burmeister.**

Riverdale, N. Y., VII (Woodruff); Flushing, N. Y., VIII; Brooklyn, N. Y., Forest Park, VI; Staten Island, VI, VII, VIII, IX; Lakehurst, N. J., VI.

Genus LEUCORRHINIA Brittinger.**L. intacta Hagen.**

Croton, N. Y., V; Bronxville, N. Y., VI (Woodruff); Manhattan Island, N. Y. City, VI; Staten Island, V, VI; Normanock, N. J., VII; Newfoundland, N. J., VII; Ramsey, N. J., VI; South Orange, N. J., IV, 18 (Collection N. J. Agri. Exp. Sta.).

Genus CELITHEMIS Hagen.**C. ornata Rambur.**

Yaphank, N. Y., VII, VIII; Wading River, N. Y., Long Pond, VIII; Jamesburg, N. J., VII, VIII; Lakehurst, N. J., VII, VIII, IX.

This species occurs along the coast from Maine to Florida, but does not appear to have been previously reported from New York State.

C. elisa Hagen.

West Point, N. Y., VI; Tarrytown, N. Y., VII; Pocantico Hills, N. Y., VI; Bronxville, N. Y., VI (Woodruff); Yaphank, N. Y., VII; Wading River, N. Y., VIII; Flushing, N. Y., VIII; Staten Island, VI, VII, VIII; Hewitt, N. J., VII; Newfoundland, N. J., VII; Newark, N. J., VII; Lakehurst, N. J., VI, VII.

C. monomelæna Williamson.

Wading River, N. Y., VIII, 8, 1912. Two males flying over the white sand at the southerly end of Long Pond. This species has been recorded from southern New Jersey, but appears not to have been listed from New York state.

The specific name *monomelæna* Williamson has been used, and based on maculation this is correct. In the four specimens in the author's collection, however, from Long Island, N. Y., New Jersey and Virginia, five fore wings have two cross veins in each triangle and three fore wings have but one cross vein in each triangle. See Ohio Naturalist, Vol. X, p. 153, 1910.

C. eponina Drury.

Tarrytown, N. Y. (Woodruff); Flushing, N. Y., VIII; Cold Spring Harbor, N. Y., VIII (H. G. Barber); Staten Island, V, VII, VIII; Lake Hopatcong, N. J., VII; Lakehurst, N. J., VII.

Genus PANTALA Hagen.

P. flavescens Fabricius.

Staten Island, VII, VIII, IX. We have seen great numbers flying over a field of oats on Staten Island; also a female laying eggs on August 14, in a ditch of brackish water by the side of the road at Watchogue, Staten Island. This is a widely distributed species.

Genus TRAMEA Hagen.

T. lacerata Hagen.

West Point, N. Y., VI, 17; Staten Island, V, VI, VIII, IX. Sometimes not uncommon over fields and the salt meadows on Staten Island.

T. carolina Linne.

Bronxville, N. Y., V (Woodruff); Yaphank, N. Y., VII; Wading River, N. Y., VIII; Staten Island, IV, V, VI, VII, IX, X; Newfoundland, N. J., IX; Great Notch, N. J., V; Jamesburg, N. J., IX; Lakehurst, N. J., IV, 25, 1908, many individuals and a pair in copulation; VI, VIII. Only two or three of our dragonflies have as long a season as this, namely from April to October. We quote the following from the "Preliminary List of the Dragonflies of Staten Island with notes and Dates of Capture" (this JOURNAL, Sept., 1898): "On July 15, 1894, a male *Tramea carolina* was flying over one of the Four Corners iron mine ponds. Soon a female came and commenced dipping her abdomen into the water. In a moment she was seized by the male and they flew away. In a half hour they were back and went flying about together, the male now and then suddenly letting go his hold and with equal rapidity catching the female again by the neck. Other male dragonflies flew after them and when the female stopped to lay eggs, they annoyed her considerably. The chief among the disturbers was a *Libellula basalis*. After a time the male *Tramea* left his mate and she was quickly seized by the aforesaid *Libellula basalis*, after which they flew about together for a considerable time. After letting go his hold once and flying down the pond, the *L. basalis* returned and seized the *Tramea* a second time."

AQUATIC HEMIPTERA.

BY H. G. BARBER,

ROSELLE PARK, N. J.

The aquatic Hemiptera have excellent and frequently wonderful adaptations to their environment, exhibiting among them most marvelous variability of construction for their life in or on the water. The local, strictly aquatic species, belong to ten families of the heteropterous Hemiptera. These for convenience of treatment of relation of adaptations to habit may be grouped into (1) those which spend their active existence on the surface of the water, (2) those which habitually walk about upon some substratum beneath the water and (3) those which are, for the most part, free swimmers.